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# **Space Network (SN)**

## **Web Services Interface (SWSI)**

### **Release 03.1**

## **Operations Readiness Review**

**Tom Sardella - Product Manager**  
**GSFC Code 583/452**

**July 10, 2003**



## *Agenda*



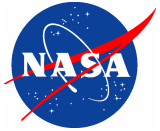
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| ▪ <b>Introduction/Background</b> | <b>Tom Sardella</b>      |
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## *ORR Review Board*



- **Lynn Myers – Code 451 (Chair)**
- **Tom Gitlin – Code 452**
- **Jim Gavura - WSC STADIR**
- **Don Shinnars - CSOC SN management**
- **John Follin - CSOC SN sustaining engineering**
- **Steve Sypher - CSOC SN operations**
- **Barry Lusby - CSOC SN maintenance**
- **Rich Lonigro - Landsat-7**



## *Background*



- **SWSI development begun in April 2000 as in-house project with CSOC support under SODA GD44**
- **Based on in-house prototype of secure, standardized web interface for providing NCCDS customer interface, used for LDB support**
- **Prototype evolved into Java-based GUI using experience gained by CSC on Spacecraft Web Interface to Telemetry and Command Handling (JSWITCH) project for Real-time Software Engineering Branch, Code 584**
- **Requirements later expanded to include Demand Access System (DAS) customer scheduling and real-time monitoring/control interface**
- **ORR is for initial release providing just NCCDS interface**
  - Final Release will include DAS interface, with ORR coinciding with DAS FOC in September 2003



## *Technical Overview*

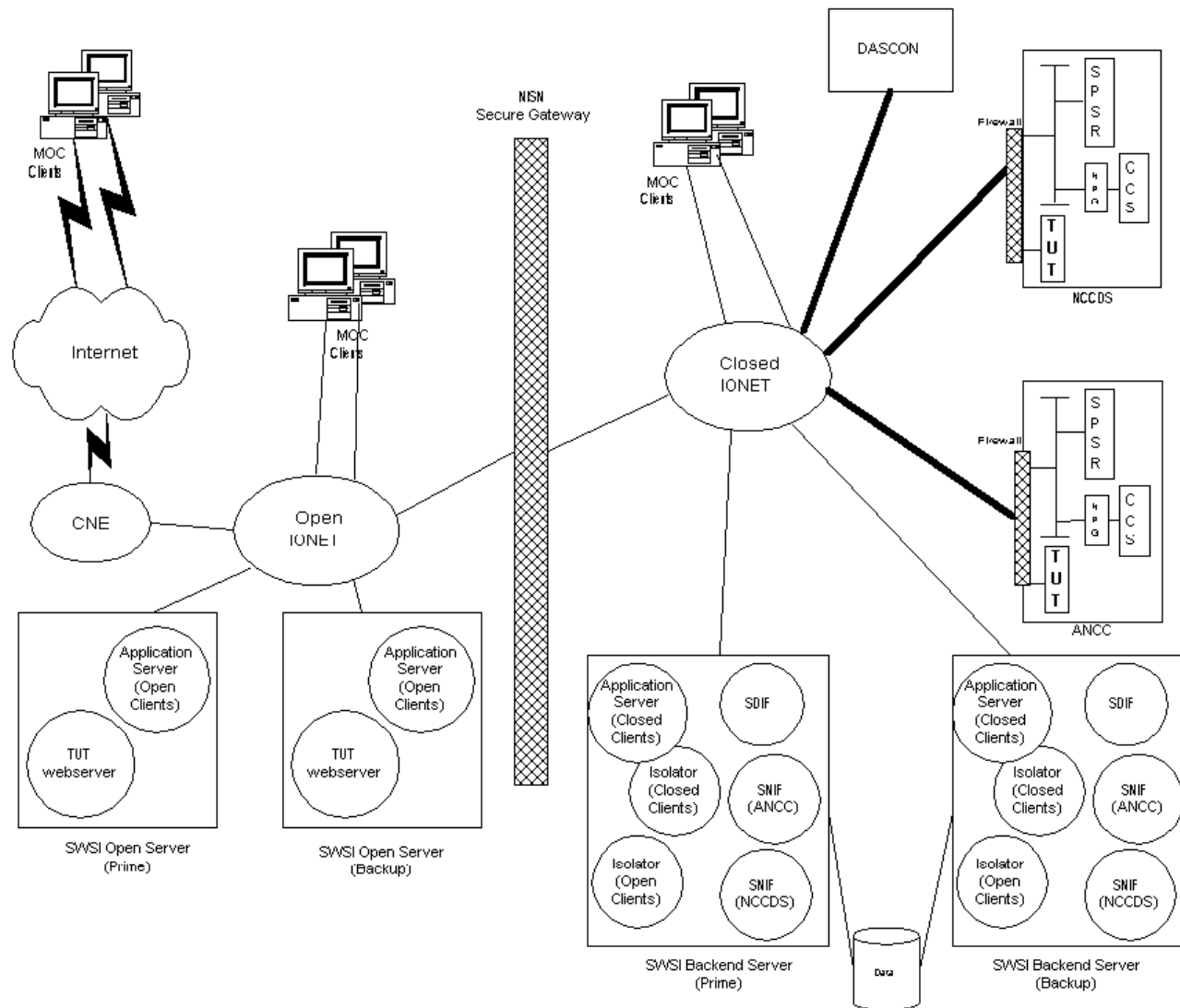


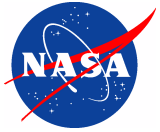
### ▪ **Capabilities**

- Standards-based customer interface for performing TDRS scheduling, real-time service monitoring and control
- Primarily intended for customers requiring low-cost solution for manual operations
- Multi-mission support
- Accessible from the Internet and NISN Open & Closed IONet
- Secure access through encryption, certification, and authentication
- Cross-platform compatible client application (Windows, Unix, etc.)
- Java-based Graphical User Interface (GUI)
- Supports full NCCDS/Mission Operations Center (MOC) interface
- Internet and Open IONet access to TDRSS Unscheduled Time (TUT)
- Test mode for performing Engineering Interface (EIF) testing and customer training



# SWSI Architecture





## *Hardware Components*



- **Client Workstation**
  - Customer's desktop workstation
  - Supports JRE 1.4.1
- **Backend Server**
  - Hosts most of SWSI server applications
  - Manages user login sessions, database storage, and communications with NCCDS, ANCC, and DAS
- **Open Server**
  - Proxy server to allow Open IONet and Internet-based customers to connect to SWSI and access TUT
  - Requests directed to Backend Server through NISN Secure Gateway



## *Hardware Components (Cont'd)*



- **Backend Servers**
  - Two Sun Microsystems Blade 1000 desktop workstations
  - 21" color monitor
  - 36 Gbyte internal SCSI disk drive
  - 4 mm 20 Gbyte DDS-4 tape drive
  - Built-in 10/100 Mbps NIC
  - Quad 10/100 Mbps expansion NIC
  - High Availability (HA) configuration using dual heartbeats
- **RAID Array**
  - Sun Microsystems 72 Gbyte Storedge A1000 External RAID Array Level 5
  - Hot-swap components (drives, power supplies, fans)
  - Database storage only
- **Open Servers**
  - Two Sun Microsystems Ultra 2 desktop workstations
  - 21" color monitor
  - 9 Gbyte internal SCSI disk drive
  - External 4 mm 12 Gbyte DDS-3 tape drive
  - Built-in 10/100 Mbps NIC
  - Quad 10/100 Mbps expansion NIC
  - High Availability (HA) configuration using dual heartbeats





# *Software Components*



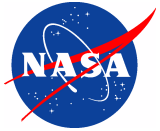
- **Client**
  - Executes on Client workstation
  - Provides Graphical User Interface (GUI) for performing SWSI client operations
- **Application Server**
  - Server process that Client connects to for accessing SWSI services
  - Tracks requests and provides responses to the Client
  - Separate instances run on Open and Backend Servers
- **Isolator**
  - Server process provides interface for Client with SWSI Database
  - Processes requests and generates responses
  - Communicates with Client through Application Server
  - Separate Isolator required for each Application Server



## *Software Components (Cont'd)*



- **SWSI-NCCDS Interface (SNIF)**
  - Server process that communicates with NCCDS using NCCDS/MOC messaging protocol
  - Separate SNIF required for each NCC (operations NCC and ANCC)
- **SWSI-DAS Interface (SDIF)**
  - Server process that communicates with DAS using DAS/SWSI messaging protocol
  - Not provided in initial SWSI release
- **Database**
  - Backend data storage for customer configuration and scheduling data
- **Open TUT Server**
  - Web server mirrors TUT services provided by NCCDS on Closed IONet
  - TUT data updated hourly



## *Hardware Status*



- **EC 8303 to install Sun hardware approved at WSC CCB on 1/8/2003**
- **Installation and integration complete**
- **Close-out of EC is outstanding**
  - Awaiting TRR
- **Fully redundant servers with automatic failover**
  - Minimal operator intervention required
- **No Line Replaceable Units (LRUs) or spare parts. All Sun hardware covered under GSFC-initiated Sun maintenance contract.**
  - Currently silver maintenance, 9x5, four hour response time
  - In process of upgrading to platinum (mission critical, 24x7)
  - WSC Operations Supervisor authorized to make service calls



## *Software Status*



- **Formal Acceptance Test completed 11/1/2002**
- **Three Patches delivered since Acceptance Test completion**
  - Intermittent server process crashes
  - Intermittent communication failures between Client and Application Server
  - Improved server process reliability
  - Client user interface issues
  - Added Database Administration, System Administration, and Server Operator tools and capabilities
  - Improved performance and bandwidth utilization
  - Some functional problems missed during Acceptance Testing
    - For example, Bug #517, Unable to Clone SAR with Prototype Event
- **Build 3 Patch 14 installed 11/6/2002**
  - 16 bug fixes, all verified fixed
  - Includes all bugs found during Acceptance Testing
- **Build 4 Patch 01 installed 4/16/2003**
  - 92 bug fixes, all verified fixed
- **Build 4 Patch 02 installed 4/21/2003**
  - 2 bug fixes, both verified fixed



## *Software Status (Cont'd)*



- **Two months of regression testing and customer interface testing with ANCC since last patch installed**
- **Final software release 03.1 installed on all four servers on 7/2/2003**
  - Bug #486, TUT transfer design causes double transmission
    - Beta version run successfully on ops servers since 4/22/2003
  - Bug #639, Multiple instances of TUT Sender
  - Bug #885, Excessive memory utilization on Application Server
    - Beta version run successfully on ops servers since 4/29/2003
  - Bug #892, SNIF shutdown sometimes doesn't work
    - Beta version run successfully on ops servers since 5/23/2003
  - Bug #903, DAS SUPIDEN sent in UPDR to NCCDS
    - Minor change, beta version run successfully on ops servers since 6/11/2003
  - Bug #906, Client user Rules of Behavior
    - Web page and Client installation instructions change
  - Bug #909, DBA Tool doesn't allow user to login with Unix authentication
    - Change to administration tool requested by WSC DBA
  - Bug #910, Negative EVENTCOUNT in Active Schedule file
    - Minor problem found during Landsat-7 EIF testing

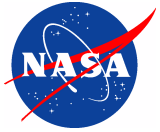


## *Software Status (Cont'd)*



### ▪ **Open Bugs**

- Bug #520, Users sometimes not logged off properly
  - Bug is officially RESOLVED, but may not be completely fixed
  - Symptom is that user can't log in because server says that user is already logged in from that IP address
  - Workaround is to restart appropriate Application Server process. Other connected users will be disconnected, then automatically reconnected.
- Bug # 556, UPDs not received for overlapping support on multiple TDRSs
  - Shuttle only known SN customer requiring overlapping support
- Bug #894, NULL Link ID for Track services in Active Schedule File
  - Was issue for Landsat-7, but they've developed a workaround
- Bug #896, DBA Tool Rejects Password with Certain Characters
  - Can't use "\*" or "=", maybe some others
- Bug #904, Users unable to login
  - Workaround is to restart appropriate Isolator
- Other open bugs are minor Client usability issues, enhancements, DAS interface-related, or still being analyzed



## *Software Status (Cont'd)*



- **Since June 2002, SWSI has supported LDB, CANDOS, SORCE, and GP-B operations and testing in a minimally supported test mode (9x5, manual backup)**
- **GSFC will continue to maintain software and have Configuration Management (CM) responsibility until Near Earth Network Services (NENS) contract**



## *Verification Results*



- **Acceptance testing was conducted by the NCC Operations Evaluation Team from 10/21/2002 – 11/01/2002**
- **All acceptance tests were conducted at the DSMC using the ANCC NCCDS**
- **Twelve test cases were run against Build 3 Patch 13**
- **Ten bugs written against the release**
  - All ten bugs fixed in subsequent patch (Build 3 Patch 14, 11/06/2002)
- **OET provided initial training to the DSMC OET**





## *Performance Verification Matrix Summary*



- **The PVM is a tool for tracking the verification of requirements documented in the SWSI System Requirements Document (SRD)**
- **Three types of requirements are identified in the PVM:**
  - General requirements:
    - Requirements that are not specifically applicable to either the NCCDS or the DAS functionalities (e.g., installation requirements, security requirements, database management requirements, etc.).
    - Verification of General requirements is applicable to the Release 03.1 ORR.
  - NCCDS requirements:
    - Requirements that specifically relate to the SWSI capability to support the SN customer-NCCDS interface.
    - Verification of NCCDS requirements is applicable to the Release 03.1 ORR.
  - DAS requirements:
    - Requirements that specifically relate to the SWSI capability to support the SN customer-DAS interface.
    - Verification of DAS requirements is NOT applicable to the Release 03.1 ORR (to be performed for the Release 03.2 ORR).



## *PVM Requirement Verification Allocation*



- **There are a total of 191 SWSI SRD requirements tracked in the PVM.**
  - A “PVM requirement” is defined by a SWSI SRD paragraph containing a contractually-binding “shall” statement.
  - Requirement breakout by type:
    - 89 General requirements.
    - 76 NCCDS requirements.
    - 26 DAS requirements.
- **SWSI PVM requirement verification allocation:**
  - 91 requirements allocated to SWSI testing.
  - 23 requirements allocated to DAS testing.
  - 25 requirements allocated to Demonstration (e.g., data management, etc.).
  - 46 requirements allocated to Inspection of SWSI documentation (e.g., SWSI Server Operator’s Manual, SWSI training material, etc.).
  - 6 requirements allocated to Analysis (e.g., RMA, etc.).



## *PVM Requirement Verification Status*



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▪ Total SWSI SRD Requirements:	191
▪ Total Requirements for Release 03.1:	165 *
▪ Total Release 03.1 Requirements Verified:	152
▪ Total Release 03.1 Requirements Not Verified:	13
▪ Total Release 03.1 Requirements Pending Verification:	6 **
▪ Total Release 03.1 Requirements Requirements Waived:	7

\* 26 DAS-related SWSI requirements to be verified for Release 03.2

\*\* 6 RMA requirements pending final verification (analysis)



## *PVM Req. Non-Compliance Summary*



Requirement Number	Description	Status	Comment
5.3	Requirement for formal SWSI hardware maintenance program.	Waived	Hardware maintenance to be performed via service contract with vendor, Sun Microsystems. Waiver SWSI-W001 granted 6/19/2003.
5.3.1.a	Develop hardware maintenance procedures in accordance with 500-TIP-2111.	Waived	Hardware maintenance to be performed via service contract with vendor, Sun Microsystems. Waiver SWSI-W001 granted 6/19/2003.
5.3.1.b	Use state-of-the-art techniques in hardware maintenance procedures.	Waived	Hardware maintenance to be performed via service contract with vendor, Sun Microsystems. Waiver SWSI-W001 granted 6/19/2003.
5.3.2.1	Requirement defines a LRU.	Waived	Hardware maintenance to be performed via service contract with vendor, Sun Microsystems. No LRUs defined for SWSI. Waiver SWSI-W002 granted 6/19/2003.
5.3.2.2.c	Requirement for fault isolation to LRU level.	Waived	Hardware maintenance to be performed via service contract with vendor, Sun Microsystems. No LRUs defined for SWSI. Waiver SWSI-W002 granted 6/19/2003.
5.3.2.2.d	Specifies first level maintenance requirement as replacement of failed LRU.	Waived	Hardware maintenance to be performed via service contract with vendor, Sun Microsystems. No LRUs defined for SWSI. Waiver SWSI-W002 granted 6/19/2003.
6.2	Requires SWSI documentation development in accordance with the DRL.	Waived	No formal SWSI DRL developed, however, documentation prepared in accordance with NASA Product Manager guidance. Waiver SWSI-W003 granted 6/19/2003.



## *Security Status*



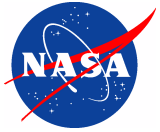
- **Security Plan/Risk Assessment reviewed and accepted by IONet Security on 6/19/2000**
- **IONet access checklist approved on 7/19/2000**
- **IONet approval to connect and operate given on 7/19/2000**
- **Authorization to Process signed on 7/10/2003**
- **Rules of Behavior distributed to SWSI users on 6/16/2003**
- **No security waivers**
- **No outstanding security issues**



## *Operational Procedures*



- **WSC Ops support personnel will develop Operational Support Procedures**
- **Procedures to be Utilized by Operations Personnel:**
  - Client operation
  - System operation
  - Database Administration
  - System Administration
- **SWSI Client Software User's Guide and SWSI Server Operator's Guide will be the source of information for procedure development**



## *Training Status*



- **Server training onsite at WSC performed June 23-27**
  - Client operation
  - System operation
  - Database administration
  - System administration
- **Client user (customer) training class available through CSOC Certification & Training Group (CCTG) at Goddard**
  - Course 885, SWSI Operations Overview



## *Customer Status*



- **Missions currently configured for interface testing**
  - C/NOFS
  - EO-1
  - GALEX
  - GP-B
  - Landsat-7
  - FUSE
- **Missions currently configured for operations**
  - C/NOFS
- **Missions to be transitioned from SWSI test servers to operational servers**
  - SORCE
  - LDB
- **Other missions upcoming for operations**
  - GP-B
  - Landsat-7
  - SWIFT
  - FUSE





## *Documentation Status*



- **Documentation online at <http://swsi.gsfc.nasa.gov>**
- **Completed Documents**
  - SWSI System Requirements Document (SRD)
  - SWSI Security Plan/Risk Assessment
  - Acceptance Test Results
  - NCCDS Master Test Plan Addendum
  - Performance Verification Matrix
- **Documents in CCB Review**
  - SWSI User's Guide, 452-UG-SWSI
  - SWSI Server Operator's Guide, 452-SOG-SWSI



## *Open Issues*



- **NISN-requested bandwidth limiting switch procurement and installation**
  - NISN concern is that additional TCP utilization will impact DSMC/NCCDS 4800 BB UDP transmissions
  - Originally raised by NISN as part of SWSI installation, but now being worked with Scott Douglas/291 as a DSMC issue
- **Sun maintenance contract**
  - Contract is being upgraded to mission critical (24x7)
- **Documents still under CCB review**
  - Draft versions available online
- **Hardware RMA requirements verification outstanding**



## *Summary*



- **Review and assignment of Action Items**
  - RFA Form available on Documentation page at <http://swsi.gsfc.nasa.gov/>
  - Submit RFAs electronically to:
    - [Jennifer.Clark@gsfc.nasa.gov](mailto:Jennifer.Clark@gsfc.nasa.gov)
  - RFAs due by COB Friday, July 18th
- **Review Board assessment**
- **Closing remarks**